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KHRUSHCHEV'S PROGRAM FOR BOOSTING CHEMICAL PRODUCTION AND AGRICULTURAL OUTPUT



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KHRUSHCHEV'S PROGRAM
FOR BOOSTING CHEMICAL PRODUCTION
AND AGRICULTURAL OUTPUT

The plan for a massive increase in the output of chemicals in the next 7 years (1964-70), which Khrushchev unveiled at the December Plenary meeting of the Soviet Central Committee, calls for about \$32 billion of new investment, \$32 billion of which would represent equipment. The accomplishment of this goal appears to be generally feasible only if the Soviet leadership is prepared to support the chemical industry through a general retrenchment on other major programs. Furthermore, sizable imports of chemical equipment from the West will be required -- perhaps \$1 billion to \$2 billion. Because of the depleted Soviet gold reserves, the amount imported probably will depend heavily on credits.

It is estimated that Khrushchev greatly overstated the additional agricultural output likely to be achieved from the sharply expanded use planned for chemical fertilizers. Judging by North American experience, 30 million to 35 million additional tons* of fertilizer (which Khrushchev indicated would be allocated to grain from the 70 million to 80 million tons of fertilizer planned for 1970) probably will yield only 30 million to 45 million tons of additional grain. The total increase in agricultural output would permit an annual per capita increase in food consumption of somewhat more than 2 percent per year, based solely on domestic production. These estimates do not take account of the possibilities of increasing agricultural output through extensive irrigation projects which are still in the talking stage.

The new goals for the textile and footwear industries indicate that a more realistic appraisal has been made of what is possible, given the present state of the economy and possibilities for expansion. Many of the goals have been reduced compared with earlier long-range (and for the most part unrealistic) projections. The fact remains, however, that even the more modest goals, if achieved, will mean that light industrial output will advance at a rate well ahead of the growth in

* Tonnages are given in metric tons throughout this publication.

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population -- the fundamental condition for an improved standard of living. Investment in light industry apparently will not grow at anything like the tempo set for the chemical industry, but the scheduled increase is well above the trend of the last several years.

The impact of the chemicals program will be borne by many sectors of the economy. Investment in heavy industry, particularly in the metallurgical and electric power industries, will lose some of its past priority. Housing, school construction, and communal services will be affected adversely. Finally, there also is likely to be a dampening effect on the rate of increase of defense expenditures, and certain stringencies are likely to appear because of this new bite into scarce resources. The competition between defense needs and the new investment demands for specialized, high-grade resources -- design engineers, scientists, skilled technicians, and high-quality machinery and materials -- will almost certainly have an impact greater than the aggregative statistics suggest.

1. Chemical Goals

A massive new program submitted by Khrushchev to the Plenum of the Soviet Central Committee at its 9-13 December meeting proposes to solve the problem of lagging agricultural output and at the same time to raise the production of textiles, plastics, and other modern-process materials by the single expedient of boosting the output of the chemical industry.

The new chemical program calls for production to increase to more than three times the 1963 production during 1964-70 -- the value of output rising from 8 billion rubles (\$7.3 billion) in 1963 to 24 billion to 26 billion rubles (\$21.8 billion to \$23.6 billion) in 1970.* Production of fertilizers is scheduled to rise to perhaps 80 million tons in 1970, four times the anticipated level of output in 1963; production of chemical fibers is to rise to more than four times the 310,000 tons produced in 1963 to 1.35 million tons in 1970; and production of plastics to more than six times, from 580,000 tons to a level of 3.5 million to 4 million tons.

* The dollar values are based on an estimated ruble-dollar exchange ratio of 1.1 rubles to US \$1, this rate reflecting the average ratio of prices for a selected group of chemical products in the two economies.

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2. Agricultural Goals

The revised agricultural goals for 1970 for production of grain, meat, and milk are expressed as ranges and are based on "recommended scientific norms of consumption," according to Khrushchev. The new targets compared with output in 1962 are as follows:

	<u>Million Metric Tons</u>	
	<u>1962</u>	<u>1970 Goal</u>
Grain	115	230 to 260
Meat	9.5*	20 to 25
Milk	64*	115 to 135

It should be noted that the Soviet claim for production of grain in 1962 was 148 million tons; this Office estimates that actual output was close to 115 million tons.

The main feature of the new agricultural program is the proposed increased productivity per acre that is to be achieved by greatly expanding the application of mineral fertilizers. Small grain croplands (predominantly wheat, rye, and barley in the USSR) are to be heavily fertilized, especially in the more humid regions, where the greatest response to fertilization can be expected. In the past, there was little use of fertilizer on these crops. Increased productivity in animal husbandry is to be achieved not only by the improved supply of concentrate feeds resulting from expansion of production of grain but also by feeding the livestock urea, synthesized amino acids, vitamins, and antibiotics.

3. Light Industry Goals

Several future goals for light industry have now been reduced from earlier unrealistic plans, notably those for production of textiles and footwear. The original goal for 1965 for production of chemical fiber, a related industry, also has been reduced by one-third, although the

* Official Soviet figure.

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goal for 1970 remains unchanged. The success of light industry in the Seven Year Plan (1959-65) has depended heavily on chemical fibers to supplement the lagging production of agricultural fibers.

The scaling-down of targets, which were mainly of value to the regime as propaganda, is not so important as an assessment of the feasibility of the new levels programed and the degree to which their achievement will satisfy the Soviet consumer's desire for improvements in his standard of living. Of the several new 1970 goals for light industry, two commodities -- textiles and shoes -- have a planned annual increase of 5 percent. Whereas this rate is not dramatic, it does reflect plans for a fair degree of improvement in the standard of living when viewed against an increase in population of about 1.5 percent a year. Likewise it stands in contrast to the virtual stagnation in output of both commodities in 1963.

The question of feasibility is not an easy one to answer without more precise investment data than Khrushchev gave in his speech. At one point, Khrushchev mentioned an investment goal of about 1 billion rubles a year. This sum apparently covers the whole of light industrial investment, which has been running between 625 million and 750 million rubles a year. The average annual increase thus required by the plan^{*} is about 7 percent in contrast to the 3.5 percent that has been achieved since 1958. Against this performance the Khrushchev plan calls for annual increases of at least 10 percent.

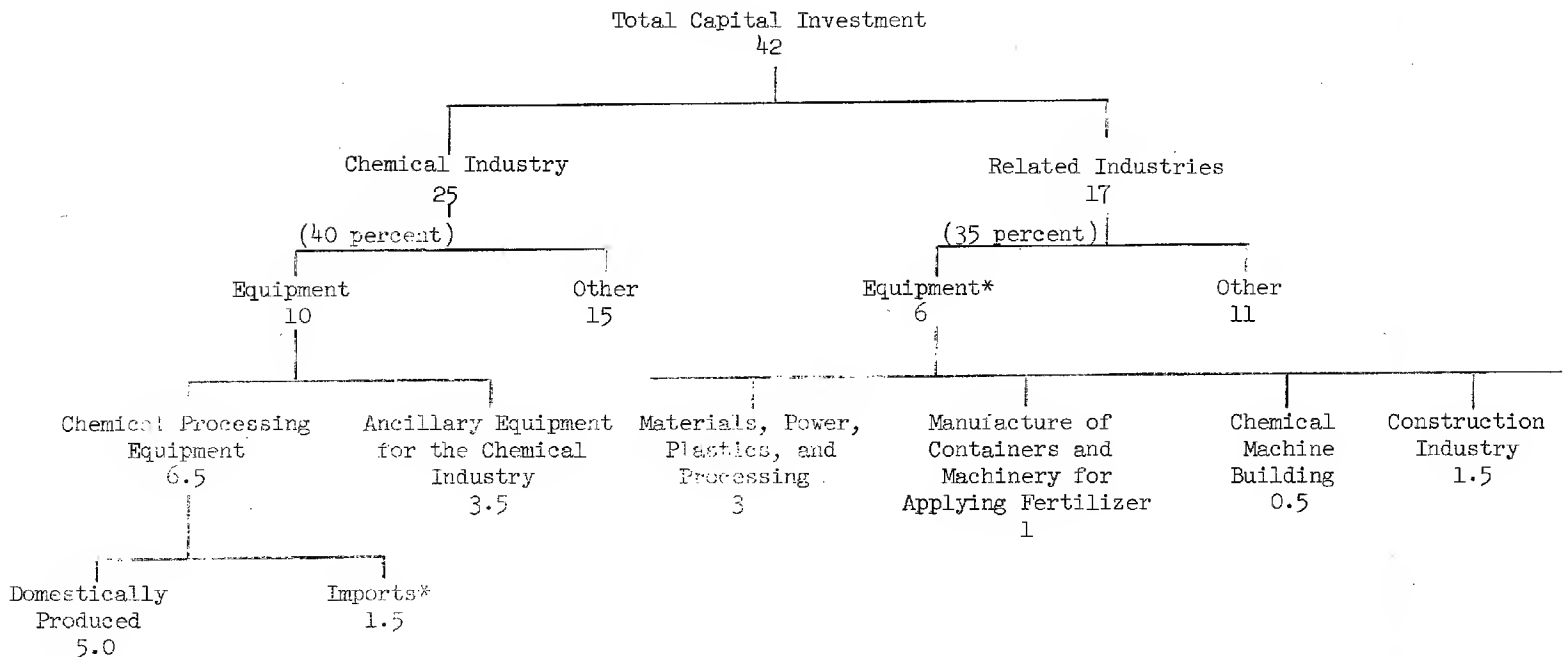
4. Chemical Investment

A total of 42 billion rubles (\$82.4 billion*) is to be invested in the Soviet economy in 1964-70 to implement the program for chemicals and to assure the efficient use of fertilizers and pesticides in agriculture. Of the total investment, at least 25 billion rubles appear to represent direct investment in the chemical industry (see the chart). The figure of 25 billion rubles is about 2.5 times the investment planned in the chemical industry under the Seven Year Plan -- in part a reflection of the magnitude of the new program but also in part almost certainly a reflection of the Soviet realization that chemical investment, per increment of output, must be larger than that planned for the 1959-65 period. Consistent with the product priorities, a significant part of the 25 billion rubles will be used in expanding production of fertilizers, fibers, and

* Based on an over-all ruble-dollar conversion rate of 0.51 rubles to US \$1, the weighted ratio estimated for total industry.

USSR: ESTIMATED DIVISION OF INVESTMENT
IN THE CHEMICAL AND RELATED INDUSTRIES
1964-70

(Billion Rubles)



* Including 0.5 billion to 1.5 billion rubles for imports of capital equipment other than chemical equipment.

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plastics: 4.5 billion rubles are allocated for construction or expansion of fertilizer plants, * 5 billion rubles for expanding production of chemical fibers and synthetic leather, and 5.3 billion rubles** for production of plastics materials and resins. The new program will attempt in part to atone for the lag in investment in 1959-63.

5. Machinery and Equipment Requirements

The Khrushchev chemical program will require more equipment during 1964-70 than can be supplied from domestic production. The value of the required equipment is estimated to be 16 billion rubles (\$32 billion***), as follows:

	<u>Billion Rubles</u>	<u>Billion US \$</u>
Total equipment for the chemical program	<u>16</u>	<u>32</u>
All equipment for the chemical industry	<u>10</u>	<u>20</u>
Chemical and rubber process equipment	6.5	13
Other (pumps, compressors, intraplant transport, controls, and instruments and mining)	3.5	7
Equipment for related industries	<u>6</u>	<u>12</u>
Materials, power, and plastics processing	3	6
Manufacture of containers and machinery for applying fertilizer	1	2
Chemical machine building	0.5	1
Construction industry	1.5	3

* Investment in agricultural chemical facilities plus the investment needed to implement their use in agriculture is planned to total 10.5 billion rubles.

** Excluding investment required for providing facilities to fabricate plastics.

*** Rubles are converted to dollar equivalents on the estimated price ratio for producer durables of 0.5 ruble to US \$1.

It is estimated that 16 billion rubles of equipment would comprise some 8 to 10 percent of the Soviet requirements for producer durable equipment for the entire economy during 1964-70 compared with perhaps 5 percent of the total comprised by corresponding types of equipment during the preceding 7 years 1957-63.

It appears that there will be a significant gap between requirements and the domestic production capability for chemical, rubber, and plastics processing equipment, which it is expected the USSR will seek to import from the European Satellites and the Free World.

In recent years, Soviet plants producing chemical equipment have increased their output rapidly but have had difficulty in producing the desired assortment and quality of output. During 1959-63, production rose by 167 percent to a volume valued at almost 300 million rubles in 1963 -- very close to the 1965 target of 350 million to 360 million rubles. The new 1970 target is for output valued at 1.2 billion rubles (\$2.4 billion), and the cumulative production over 7 years would be approximately 5.0 billion rubles (\$10 billion).

The chemical equipment industry does not have an adequate base for the production demands being placed on it. Less than 100 million rubles (\$200 million) were invested in the chemical equipment industry during the 4 years 1959-62. During the 7 years 1964-70, 1.5 billion rubles (\$3 billion) will have to be invested. To quadruple output above that of 1963 by 1970, the industry will face severe problems in establishing production of new models of equipment and in obtaining the necessary engineers and skilled workers.

Some underfulfillment is to be expected of the production plan for chemical equipment, perhaps as much as 5 to 10 percent. For some of the more technologically advanced types of equipment, the underfulfillment probably will be larger. If there is access to technology from the Free World, however, what amounts to a substantial fulfillment of the domestic production program is to be expected, assuming that priorities for chemicals are sufficiently high. Fulfillment of the planned production volume of 5.0 billion rubles during the 7 years 1964-70, however, would still leave an import requirement of 1.5 billion rubles (see the chart*).

The regime appears to be committed to devote extensive resources to building up the capacity of the chemical equipment industry. Leonid Kostandov, chairman of the State Committee for Chemical and Oil Machine Building, is an impressive administrator who has been termed by Western observers the "top fertilizer man" in the USSR. He has been active in

* P. 5, above.

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negotiations for equipment from the Free World and is familiar with Western technology.

6. Labor Requirements of the Chemical Program

Only a slight acceleration in the growth of employment in the chemical industry will be required to carry out the planned tripling of chemical production by 1970. The number of production workers in that industry currently is estimated at about 1 million and represents 5 percent of the production workers in all manufacturing and mining industries.

Nikolay Baybakov, chairman of the State Committee for the Chemical and Oil Industry, announced at the recent Plenum that "some 850,000 skilled workers and 350,000 engineers and technicians will have to be trained in the next decade" to meet the demands of the chemical program. To reach this goal would require the graduation of at least 35,000 chemical engineers and technicians annually compared with 14,000 currently, which may prove to be a bottleneck. Skilled workers for the chemical industry would have to be trained at an annual rate of 85,000 compared with the current rate of 60,000.

The considerable time that will be required to prepare these skilled workers, as well as to train the additional engineers and technicians, suggests that the existing fierce competition among industrial managers for such personnel, who are still in very short supply in spite of rapid gains in education, may be intensified temporarily.

Additional demands for manpower also will be felt in the machine-building industry, in construction, and in other branches of the economy that will have to provide the capital equipment for the chemical industry. Because no significant acceleration in the growth of the labor force is expected during the remainder of the 1960's, these demands will have to be met by a diversion of labor resources from other nonagricultural activities.

7. Foreign Trade Requirements

The gap between the estimated Soviet production capability and requirements for machinery of all types for the chemical program during 1964-70 could be filled by imports totaling about 2 billion to 3 billion

rubles (\$4 billion to \$6 billion). The largest and most important part of this requirement is for chemical equipment. Given the estimated future performance of the Soviet chemical industry, imports of about 1.5 billion rubles (\$3 billion) would be needed to meet requirements.

In the 7-year period 1956-62 the USSR imported chemical equipment valued at 675 million rubles (\$1.4 billion), more than 60 percent of which was supplied from the Free World. Soviet purchases from the Free World were composed largely of advanced processes and equipment. The leading suppliers of chemical equipment to the USSR have been Czechoslovakia, the UK, East Germany, and West Germany.

Khrushchev stated that Satellite deliveries of chemical equipment could amount to 1 billion rubles (\$2 billion) during 1964-70. It is unlikely, however, that these countries could provide more than three-fourths of this amount in view of their past export performance, their own internal economic difficulties, and ambitious plans to develop their own chemical industries.

To fulfill the new plan, Soviet requirements for chemical equipment from the Free World are sizable -- perhaps \$1 billion to \$2 billion. Because of the depleted Soviet gold reserves, the amount imported probably will depend heavily on credits. The assessed maximum Satellite capability for such exports is 750 million rubles over the 7-year period. Part of the equipment to be imported from the Free World in 1964-70 already has been contracted for. The implication in the Khrushchev speech that the Satellites would fill the major part of Soviet import needs for chemical equipment does not reflect the Soviet need and preference for equipment from the Free World. Both the USSR and the Satellites are deficient in the latest engineering advances and the associated process technology.

The USSR must have credits just to maintain its 1963 level of imports from industrialized countries of the Free World. Soviet reserves of foreign exchange are negligible relative to what is needed. Moscow's ability to expand exports to generate foreign exchange is very limited at present. The gold reserve now being used to finance grain purchases will be reduced in 1964 to an estimated \$1.5 billion, or less if grain purchases from the US go through, a level that could well be regarded as very disturbing by the Soviet leaders. Embarking on a stepped-up program to purchase Western chemical facilities would impose additional strains -- hence the Soviet drive for more favorable credit terms.

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8. Impact on the Soviet Economy

Investment of 42 billion rubles in the chemical program for the 7-year period is roughly equivalent to total new fixed investment in 1963. Of this amount, 60 percent, or 25 billion rubles, is scheduled for the chemical industry. Thus investments in this branch of industry may increase as a share of industrial investments from 10 percent in 1963 to 18 percent by 1970. This shift would result from an average annual rate of increase of 22 percent in investments in the chemical industry and an assumed annual increase for total investments in industry of 9 to 10 percent.

The chemical program will generate requirements for expansion of production capacity in several areas of machine building in addition to chemical equipment. These areas include equipment for plastics processing, the application of agricultural chemicals, the electric power industry, ore mining, the petroleum and gas industries, the manufacture of paper, the manufacture of containers and bags, the alloying of metals, and the manufacture of process control and laboratory equipment. Such an expansion will lessen the possibility that production capacity for chemical equipment can be enlarged at the same time that the investment requirements for machine building as a whole are held to low levels or will require a slowdown in the rate of acquisition of machinery by other programs.

The reallocation of economic resources for Khrushchev's chemical program probably could be carried out without serious disruption of the economy; however, there will be a retardation in the growth of many other sectors. In addition to a probable slowdown in the recent rate of increase in defense outlays, certain other elements in both heavy industry and consumer services probably will have to expand more slowly than in the past decade. For example, over-all investment in what the USSR labels as nonproductive activity -- housing, schools, communal services -- may be held to its recent slow pace. The rapid acceleration of housing and other investments in consumer welfare in the latter half of the 1950's brought the nonproductive share of total investments up to about 40 percent. But the annual average increases of 20 to 25 percent for 1956-58 were replaced by rates of increase of 1 to 3 percent in the early 1960's. If Khrushchev intends to concentrate on consumer programs that give more emphasis to the quality and quantity of food and clothing, attainment of housing goals will be pushed into the next decade.

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Khrushchev did not disclose which industrial sectors might have to give way under the impact of resource diversion for chemistry, merely saying that "some industries" would have to slow their growth "temporarily." Earlier this fall a Soviet official said that certain segments of the machine building industry would be trimmed; he also mentioned the coal industry, which for several years has been growing at a rate considerably below original objectives of the Seven Year Plan. The ferrous metallurgy industry has been a favorite Khrushchev target whenever he has wanted to point to an industry that has been growing at an unnecessarily high rate. Although many of the required resources for the new programs -- construction materials, carpenters, bricklayers -- can be obtained by holding housing and other nonessential programs to present levels, stringencies may be felt because of shortages of certain categories of specialized resources. There is evidence that diversion of "quality" resources to military and space programs has been more important in causing the recent slowdown in over-all growth than the quantitative shift reflected in the aggregate statistics. For example, there has been increasing competition between defense and investment needs for specialized, high-grade resources -- scientists, design engineers, highly trained technicians, and high-quality materials and machinery components. The very industrial sector that Khrushchev wants to expand most rapidly (chemicals) demands large quantities of these specialized resources. If the possibilities for expanding the supplies of these resources are very limited, the impact of the new program on military and space programs may be greater than suggested by aggregative data.

Production of nitrogenous fertilizers and of some missile propellants, conventional ammunitions, and explosives is based on virtually identical basic materials and processes. However, in terms of fixed nitrogen, military requirements for the next few years are unlikely to account for a significant percentage of total nitrogen production. The incremental availability to nitrogenous fertilizer that this percentage represents would appear to be much too small to be crucial to the success of Khrushchev's long-term program. Only in the very short term (1964), when an increment of 20 percent in the application of nitrogenous fertilizer seems desired, could any significant gain to the fertilizer program be derived from inroads into military requirements.

9. The Program and Agricultural Output

In evaluating Khrushchev's program, it is important to recall that grandiose plans for Soviet agriculture are not new and that achievements

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have nearly always fallen far short of goals. There has never been any evidence that Soviet "plans" for agriculture are arrived at by a serious and systematic calculation of required inputs versus a reasonable expectation of outputs. Rather, the plans generally seem to involve three elements: (a) a notion of "needs" -- that is, what it would be nice to have; (b) a notion that all farms ought to be able to do as well as the best farms; and (c) the propaganda and political impact, both domestic and international.

The response of crops to fertilization that is expected by Khrushchev and by some Soviet scientists appears to be too high. The more enthusiastic scientists have stated that "at least" 2 to 3 tons of grain may be expected per ton of fertilizer, as opposed to a US experience rate of 1 to 2 tons of grain per ton of fertilizer. Khrushchev chose the rate of 2 to 3 tons as being "commonly believed" but apparently used the rate of 1.5 tons to calculate the increase in production of grain that can be expected.

Past performance in the use of resources in Soviet agriculture, particularly the use of chemical fertilizers, strongly suggests a somewhat lower response of crops to fertilization in the USSR than has been realized in North America. The response in North America has been obtained through relatively efficient use of fertilizers. Within their institutional framework the USSR is unlikely by 1970 to match the level of efficiency in the use of fertilizer that has been achieved in North America and could well fall far short of it.

An estimation of the over-all benefits to Soviet agriculture of quadrupling production of chemical fertilizers is extremely tenuous. However, the estimate at this time is that with this amount of fertilizer, net agricultural output by 1970 may increase by roughly one-fourth above the 1958-62 level.

Khrushchev indicated that 30 million to 35 million tons of fertilizer would be applied to grain crops by 1970. It is estimated that the increase in production of grain that probably will result from the use of this fertilizer will be about 30 million to 45 million tons. Thus production of grain in the USSR by 1970 is expected to increase one-fourth to one-third above the grain crop that would be expected from the current grain acreage under normal weather conditions. The increments to the production of other crops, attributable to increased fertilization, will be less pronounced. Natural conditions will limit the response of crops to the very high rates of fertilization planned for the future. The

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USSR has no large areas climatically analogous to the southeastern US or to the Corn Belt, where moisture is abundant and soils are highly responsive to fertilization. A much larger part of the cropland of the USSR is in subhumid areas like the US Great Plains and the prairie provinces of Canada, where potential crop yields as a result of fertilization are less than in more humid areas.

The Soviet livestock industry will benefit significantly from the increments to production of grain and other forage crops. Production of livestock products in the USSR by 1970 may increase by roughly one-fourth as a result of the larger supplies of feed accruing from the fertilizer program together with some improvement in the efficiency of feed use as a result of the feed additives.

10. The Program and the Consumer

For Khrushchev, who has posed as the champion of the consumer, the present situation must be particularly galling. He has aroused consumer expectations by his unending pronouncements of unrealistic consumption goals. By reducing taxes, by raising transfer payments, and by allowing the upward drift in money incomes to continue, he has given the Soviet population purchasing power that cannot be used under the existing supply of consumer goods and services. Since 1959, as shown in the table,* the growth in average levels of real consumption has faltered badly while per capita disposable income has continued to increase at about 5 to 7 percent per year.

Although the rate of growth of consumption recovered somewhat in 1962, the outlook is for a setback in 1963. In spite of the decision to import wheat and flour, the poor harvests of this year probably will depress production of food products through 1964 and lower their quality. Distress slaughtering may push output of meat upward this winter, but the rate of increase should decline later as a result of the impact of such slaughtering on numbers of livestock.

There are firm signs of significant inflation in the USSR. Between 1959 and 1962, prices on the collective farm (free) market rose from 31 percent to 49 percent above prices in state stores in spite of the increases in prices of meat, butter, and potatoes in the latter stores during 1962. The index of prices on the collective farm market for the

* P. 14, below.

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USSR as a whole rose by 14 percent during 1961-62, and the index undoubtedly has continued to rise in 1963. Between January and October of 1963, prices in the Moscow collective farm markets increased by 23 percent.

Average Annual Per Capita Rates of Growth of Consumption

	Percent					
	<u>1951-55</u>	<u>1956-58</u>	<u>1959-62</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
Total consumption per capita	5.6	4.0	3.0	2.1	1.5	3.3
Food	4.1	3.1	1.8	0	0	2.8
Nonfood	11.6	5.9	4.6	4.8	2.9	3.9
Soft goods	10.1	5.2	3.5	3.7	1.9	3.3
Durable goods	N.A.	9.6	9.1	10.1	7.4	6.1
Services	4.0	4.3	5.2	5.5	5.0	4.4
Housing	0	2.7	2.5	3.0	1.8	1.3

Much of the slowdown in growth of per capita consumption can be traced to those components of consumption -- food and soft goods -- that the chemical program could be expected to help most. It is not likely, however, that either the fertilizer program or the expansion of capacity for output of artificial fibers could have much effect before 1965 or 1966. If the overdue good harvest year occurs in 1964, consumption levels could increase over the next year or so without the benefits of the chemical program. Increased output of fertilizer and the spreading of knowledge of how it should be used are supposed to insure successful harvests thereafter. In any case, Khrushchev's announced goals for agricultural output in 1970 are almost unchanged from those put forward in 1961. However, they still contain a heavy element of propaganda rather than an estimate of the concrete results to be derived from the fertilizer program. Present tentative estimates of agricultural output in 1970 would allow an average annual per capita increase in consumption of food of somewhat more than 2 percent from domestic production alone.

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In his speech, Khrushchev took a more realistic view of his plans for light industry, and the original 1970 goals for textiles and leather footwear were cut back. Although he stressed future reliance on chemical fibers, he announced a new goal for the output of chemical fibers in 1965 that is one-third lower than the existing plan.

Another factor in the gloomy short-run outlook for the consumer is the effect of the chemical program on priorities for housing, schools, and other investment in the communal economy. It seems likely that the future pace of construction in these areas will not allow any increase in the rate of growth of the services component of consumption.

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